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IS 5352-1 (1999): Textile - Glass and Glass-polyester Fibre Woven Tapes, Part 1: Specification [TXD 12: Narrow Fabrics, Webbing and Braids]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
वस्त्रादि — शीशा और शीशा-पॉलिएस्टर
फाइबर वोवन टेप
भाग 1 विशिष्टि
(तीसरा पुनरीक्षण)

Indian Standard
TEXTILE — GLASS AND GLASS-POLYESTER FIBRE
WOVEN TAPES
PART 1 SPECIFICATION
(*Third Revision*)

ICS 59.060.30

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FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Narrow Fabrics, Webbing and Braids Sectional Committee had been approved by the Textile Division Council.

This standard, first published in 1969, was subsequently revised in 1974 and 1988. This standard has been revised again and divided into two parts. Part 2 of this standard gives methods of test for various requirements.

In the preparation of this standard, substantial assistance has been derived from IEC 1067-1 : 1992 'Specification for glass and glass polyester fibre woven tapes — Part 1 : Definitions, classifications and general requirements' and IEC 1067-3 : 1992 'Glass and glass polyester fibre woven tapes — Part 3: Specifications for individual materials — Sheet 1 : Types 1, 2 and 3 tapes'.

Glass fibre woven tapes conforming to the specification are intended for use in transformers, industrial machines, turbo-generators and water-wheel alternators.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TEXTILE — GLASS AND GLASS-POLYESTER FIBRE WOVEN TAPES

PART 1 SPECIFICATION

(*Third Revision*)

1 SCOPE

1.1 This standard prescribes constructional particulars and other requirements for loom-state, continuous filament tapes woven on conventional or shuttleless looms either from glass fibres or a combination of glass and polyester fibres.

1.2 This standard cover tapes of nominal width of 10 mm to 50 mm with nominal thickness of 0.05 mm to 0.40 mm .

2 REFERENCE

The following standard contains provision which through reference in this text, constitutes provision of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

<i>IS No.</i>	<i>Title</i>
1954 : 1990	Method for determination of length and width of fabrics (<i>second revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Filament — A single glass fibre as drawn.

3.2 Strand — A plurality of filament bonded with size.

3.3 Yarn — A number of strands put together with twist.

3.4 Linear Density — The mass in grams per kilometre of strand (Tex).

3.5 End — Individual warp thread.

3.6 Pick — Weft thread or group of threads inserted in a fabric by one traverse of the picking mechanism between two consecutive beat-ups.

3.7 Size — A mixture of organic materials applied to the strand during manufacture to facilitate yarn processing and weaving.

3.8 Locking Thread — Independent thread used to lock the weft threads.

3.9 Shuttleless Loom — Loom in which the weft is inserted by means other than shuttle and is drawn from stationary supply.

3.10 Heat Set Yarn — Yarn which has been heat treated so that subsequent shrinkage is reduced.

4 CLASSIFICATION

The tapes are classified into three types namely:

- a) *Type 1* — Tapes woven on shuttle looms with glass yarn in both warp and weft direction.
- b) *Type 2* — Tapes woven on shuttleless looms with glass yarn in both warp and weft direction.
- c) *Type 3* — Tapes woven on shuttleless looms with glass fibres in warp direction and polyester filament in the weft direction.

5 MANUFACTURE

5.1 Yarn

The glass yarn used shall be continuous filament glass fibres (usually known as 'E' glass) containing not more than 1 percent of alkali calculated as sodium oxide. The polyester yarn shall be continuous filament polyethylene terephthalate (PET) and shall be heat set.

5.2 Weave

The tape shall be woven in plain weave with selvages. The selvages shall be uniform. The tape shall be in the loom-state condition and shall not be calendered.

5.3 Locking Thread

For Type 2 and Type 3 tapes, the picks shall be interlocked at or near the selvedge opposite the one from which weft is inserted, thus preventing unravelling of the selvages during use. If a locking thread, which may be of organic material, is used, the method of interlocking shall be such that the thread cannot be pulled out of the body.

5.4 Centre Marking

Centre line/markings of any colour may be provided if specified by the buyer.

5.5 Identification of Types of Tapes

Tapes shall be identified according to type as follows:

- a) *Type 1* — A single coloured warp thread positioned so as to indicate the centre line of the tape.
- b) *Type 2* — Two coloured warp threads close together and positioned so as to indicate the centre line of the tape.
- c) *Type 3* — Three coloured warp threads close together and positioned so as to indicate the centre line of the tape.

6 REQUIREMENT

6.1 Thickness

The nominal thickness measured between the selvages of the tape shall comply with the values given in Table 1. Thickness, when measured at the selvages, shall not exceed the thickness between the selvages by more than 0.02 mm for Type 1 or 0.03 mm for Type 2 and Type 3. The thickness of tapes shall be determined by the method prescribed in Part 2 of this standard.

Table 1 Thickness and Tolerance

Nominal Thickness	Minimum Thickness	Maximum Thickness
mm	mm	mm
(1)	(2)	(3)
0.09	0.08	0.11
0.13	0.12	0.17
0.18	0.16	0.21
0.23	0.21	0.26
0.28	0.26	0.31
0.40 (See Note)	0.37	0.43

NOTE — Normally available in Type 2 and Type 3.

6.2 Width

The nominal widths of tape are 10, 13, 15, 20, 25, 30, 40 and 50 mm. The width of the tape as determined, in accordance with the method given in Part 2 of this standard, shall not differ from that specified by more than:

- a) ± 1.0 mm for nominal widths up to and including 25 mm
- b) ± 1.5 mm for nominal widths over 25 mm.

6.3 Length

Unless otherwise specified, the tape shall be supplied on rolls in 50 m length. The number of joints per roll

shall not exceed two, and none of the tape pieces in a roll shall be shorter than 10 m. The length of the tape in each roll shall be determined by the method prescribed in IS 1954.

6.3.1 In case of roll with joints, the tape pieces shall be butted and joined up by a strip of coloured gummed tape which shall show on the edge of roll to indicate the presence of joint. Pins or other metal fasteners shall not be used for securing the ends of rolls or for joining the tape.

6.3.2 The number of rolls having joints shall not exceed the following:

- Type 1 — 30 percent
- Type 2 — 30 percent
- Type 3 — 20 percent

6.4 Tensile Strength

The tape shall comply with the requirement of tensile strength as given in Table 2 when tested by the method prescribed in Part 2 of this standard.

Table 2 Tensile Strength in Warp Direction

Nominal Thickness mm	Tensile Strength in Warp Direction, Min (N/mm)	
	Types 1 and 2	Type 3
(1)	(2)	(3)
0.09	25	30
0.13	30	35
0.18	40	45
0.23	45	65
0.40	70	75

6.5 Other Requirements

The tapes shall conform to the requirements given in Table 3 when tested by the respective methods of test given in Part 2 of this standard.

7 PACKING

7.1 Winding

The tape shall be wound on a hard tubular core with sufficient tension to form a compact roll but without deforming the construction of the tape. The internal diameter of core shall be not less than 10 mm and not more than 13 mm and its width shall be approximately the same as the width of the tape but shall not exceed it. The roll shall not get loosened when dropped on floor from a height of one metre. Alternatively individual core having a diameter of 55 mm is also permitted.

The tapes shall be wound in an anti-clockwise spiral when the roll is viewed from the locking thread, as shown in Fig. 1 .

Table 3 Requirements of Glass and Glass Polyester Woven Tapes

(Clause 6.5)

Sl No.	Characteristic	Requirement
(1)	(2)	(3)
i)	Warp ends:	
	a) Nominal thickness ≤ 0.13 mm	≥ 25 per cm of nominal width
	b) Nominal thickness ≥ 0.13 mm	≥ 20 per cm of nominal width
ii)	Picks:	
	a) Nominal thickness ≤ 0.13 mm	≥ 14 per cm
	b) Nominal thickness > 0.13 mm	≥ 10 per cm
iii)	Effect of heating in air:	
	a) Types 1 and 2	Tensile strength retention > 50 percent
	b) Type 3	Loss in width < 5 percent
iv)	Residue on ignition (Glass content):	
	a) Types 1 and 2	> 97.5 percent
	b) Type 3	not applicable
v)	Electrical conductivity of aqueous extract	< 15 mS/m (milli Siemens/metre)

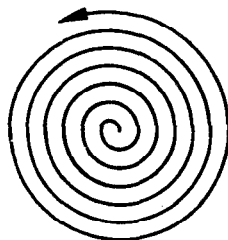


FIG. 1 VIEW OF ROLL FROM LOCKING THREAD SIDE

- Number of rolls in the package;
- Type of tape;
- Length of roll in metres;
- Thickness and width of tapes in millimetres;
- Manufacturer's name, initials or trade-mark, if any; and
- Year of manufacture.

8 MARKING

8.1 Outer end of tape of each roll shall be legibly marked with the following information:

- Type of tape;
- Length of roll in metres;
- Thickness and width of tapes in millimetres;
- Manufacturer's name, initials or trade-mark, if any; and
- Year of manufacture.

8.1.1 Each roll may also be marked with the Standard Mark.

8.1.2 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8.2 Package containing numbers of rolls as agreed to between the buyer and the seller shall be marked with the following:

9 SAMPLING

9.1 Lot

The quantity of tape of one definite variety delivered to one buyer against one despatch note shall constitute a lot.

9.2 The conformity of a lot to the requirements of this standard shall be determined on the basis of tests carried out on rolls of tape selected from the lot.

9.3 Unless otherwise specified, the number of rolls of tape to be selected at random from a lot shall be as given in Table 4.

9.4 For evaluating width, length, ends per centimetre, picks per centimetre and thickness, the number of rolls selected in col 2 of Table 4 shall constitute the test sample.

9.5 For evaluating tensile strength, electrical conductivity of aqueous extract, effect of heating in air and glass content, the number of rolls selected in col 4 of Table 4 shall constitute the test sample. The rolls shall be selected at random from those drawn for the purpose of 9.4. The required test specimens shall be drawn from each of the rolls and subjected to corresponding tests.

9.6 Criteria for Conformity

The lot shall be considered as conforming to the requirements of the standard if the following conditions are satisfied:

- a) The number of rolls found defective for any one or more of the characteristics mentioned in 9.4 does not exceed the corresponding number given in col 3 of Table 4.
- b) None of the test samples fails to meet the specified requirement in respect of the characteristics mentioned in 9.5.

Table 4 Sample Size and Criteria for Conformity
(Clauses 9.3, 9.4, 9.5 and 9.6)

Lot Size (Number of Rolls)	Sample Size	Permissible Number of Defective Rolls	Sub-sample Size
(1)	(2)	(3)	(4)
Up to 100	5	0	2
101 to 300	13	0	3
301 to 500	20	1	5
501 to 1 000	32	2	8
1 001 and above	50	3	8

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